

Amendments to the Claims

The second claim 13 and the following claim 14 were renumbered claims 14 and 15, respectively.

Taking into account the correction of the claim numbers:

Claims 9, 29, and 30 have been cancelled.

Claims 1-3, 5, 10, 11, 13-18, 20-21, 23-26, 28, 31, and 32 have been amended.

Claim 33 has been added.

1. (currently amended) The~~A~~ bi-phase modulator ~~for an ultra-wideband signal of claim 17, comprising: a~~ wherein said symmetrical transformation device that receives an input UWB waveform and converts the energy of the input waveform into the energy of a first waveform and a second waveform, wherein the first waveform and second waveform are substantially identical waveforms of opposite polarity; ~~and a,~~ and wherein said selector device that presents one of the first waveform as the first output waveform or the ~~and~~ second waveform as the second output waveform at the output of the bi-phase modulator in response to the state of an information signal and concurrently terminates the other one of the first waveform ~~and/or the~~ second waveform.
2. (currently amended) The~~A~~ bi-phase modulator ~~for an ultra-wideband signal of claim 17, said symmetrical transformation device~~ comprising:
 - a first symmetrical transformation device that receives an input waveform and converts the energy of the input waveform into the energy of a first waveform and a second waveform, wherein the first waveform and output waveform are substantially identical waveforms of opposite polarity; and
 - a second symmetrical transformation device that receives the first waveform and the second waveform and converts the energy of the first waveform and the second waveform into the energy of an output waveform; ~~and a,~~ wherein said selector device ~~serves~~serving as a

crossover switch between the first symmetrical transformation device and the second symmetrical transformation device which presents the first waveform as the first output waveform ~~and/or~~ the second waveform as the second output waveform via a direct connection state or an inverted connection state in response to the state of an information signal.

3. (currently amended) The bi-phase modulators of claims ~~171~~ and 2, wherein the symmetrical transformation device comprises balanced transmission lines ~~serially~~ coupled to unbalanced transmission lines.

4. (original) The bi-phase modulator of claim 3, wherein the selector comprises a switch having a ground reference connection to one of a virtual ground and a physical ground associated with one of the balanced transmission lines and the unbalanced transmission lines.

5. (currently amended) The bi-phase modulator of claim 3, wherein at least one of the balanced transmission lines ~~and/or the~~ unbalanced transmission lines has impedance tapers.

6. (original) The bi-phase modulator of claim 1, wherein the symmetrical transformation device comprises a center tapped primary transformation device having a primary to secondary field coupling mechanism for selective waveform polarity conveyance to a differential device.

7. (original) The bi-phase modulator of claim 6, wherein said differential device is a UWB antenna.

8. (original) The bi-phase modulator of claim 1, wherein the symmetrical transformation device comprises a center tapped secondary transformation device having a primary to secondary field coupling mechanism for selective waveform polarity conveyance waveform coupling mechanism to a differential device.

9. (cancelled) The bi-phase modulator of claim 1, wherein the symmetrical transformation device comprises a center tapped primary transformation device having a primary to secondary field coupling mechanism for selective waveform polarity conveyance to a differential device.
10. (currently amended) The bi-phase modulator of claim ~~98~~, wherein said differential device is a UWB antenna.
11. (currently amended) The bi-phase modulator of claim 2, wherein at least one of the first symmetrical transformation device ~~and~~or the second symmetrical transformation device comprises a center tapped primary transformation device having a primary to secondary field coupling mechanism for selective waveform polarity conveyance to a differential device.
12. (original) The bi-phase modulator of claim 11, wherein said differential device is a UWB antenna.
13. (currently amended) The bi-phase modulator of claim 2, wherein at least one of the first symmetrical transformation device ~~and~~or the second symmetrical transformation device comprises a center tapped secondary transformation device having a primary to secondary field coupling mechanism for selective waveform polarity conveyance waveform coupling mechanism to a differential device.
- ~~13~~14. (currently amended) The bi-phase modulator of claim 13, wherein said differential device is a UWB antenna.
- ~~14~~15. (currently amended) The bi-phase modulator of claims ~~1 and 2~~17, wherein the information signal comprises at least one of a data signal ~~and~~or a channel signal.
16. (currently amended) The bi-phase modulator of claim ~~13~~15, wherein the channel

signal is in accordance with a time hopping code.

17. (currently amended) A bi-phase modulator for an ultra wideband (UWB) signal, comprising:

a symmetrical transformation device that receives an input UWB waveform and converts the energy of the input UWB waveform into the energy of a first output UWB waveform ~~and/or~~ a second output UWB waveform, wherein the first output UWB waveform and the second output UWB waveform are substantially identical waveforms of opposite polarity; and

a selector device that presents one of the first output UWB waveform ~~and/or the~~ second output UWB waveform at the output of the bi-phase modulator in response to the state of an information signal.

18. (currently amended) The bi-phase modulator of claim 17, wherein the symmetrical transformation device comprises input transmission lines that are ~~serially~~ coupled to output transmission lines.

19. (original) The bi-phase modulator of claim 18, wherein the output transmission lines have a common node.

20. (currently amended) The bi-phase modulator of claim 19, wherein the selector device comprises a switch that is grounded by the common node.

21. (currently amended) The bi-phase modulator of claim 18, wherein at least one of the input transmission lines ~~and/or the~~ output transmission lines comprise at least one of coupled lines, coaxial lines, slotlines, microstrips, ~~and/or~~ striplines.

22. (original) The bi-phase modulator of claim 18, wherein the input and output transmission lines are tapered transmission lines.

23. (currently amended) The bi-phase modulator of claim 18, wherein the selector device comprises a crossover switch that serially couples the input transmission lines to the output transmission lines, said crossover switch being responsive to the state of the information signal for presenting one of the first output UWB waveform ~~and~~ or the second output UWB waveform at the output of the bi-phase modulator.

24. (currently amended) The bi-phase modulator of claim 17, wherein the symmetrical transformation device divides the energy of the input waveform into energies of the first output UWB waveform and the second output UWB waveform.

25. (currently amended) The bi-phase modulator of claim 17, wherein the symmetrical transformation device converts the energy of the input waveform ~~into the energy~~ directly into the energy of the first output UWB waveform or inversely into the energy of the second output UWB waveform based on the state of the information signal.

26. (currently amended) The bi-phase modulator of claim 25, wherein the symmetrical transformation device uses a crossover switching arrangement for direct or inverse transformation of the energy of the input waveform into the energy of one of the first output UWB waveform ~~and~~ or the second output UWB waveform.

27. (original) The bi-phase modulator of claim 17, wherein the symmetric transformation device comprises a center tapped transformation device having a primary coupling mechanism for receiving the input UWB waveform and a secondary coupling mechanism coupled to a differential UWB antenna.

28. (currently amended) The bi-phase modulator of claim 17, wherein the symmetric ~~transformer~~ transformation device comprises a center tapped transformation device having a secondary coupling mechanism for receiving the input UWB waveform and a primary

coupling mechanism coupled to a differential UWB antenna.

29. (cancelled) The bi-phase modulator of claim 17, wherein the information signal comprises at least one of a data signal and a channel signal.

30. (cancelled) The bi-phase modulator of claim 29, wherein the channel signal is in accordance with a time hopping code.

31. (currently amended) The bi-phase modulator of claim 17, said A-symmetrical transformation device, comprising:

a first input transmission line having an unbalanced input for receiving ~~an~~said input UWB waveform;

a second transmission line, said second transmission line being balanced and being coupled to said first transmission line; and

a third transmission line, said third transmission line having a first unbalanced output and a second unbalanced output and being coupled to said second transmission line; ~~wherein~~ wherein ~~said first output UWB waveform is output the first unbalanced output and said second output UWB waveform is output the second unbalanced output, wherein said first output UWB waveform and said second output UWB waveform are substantially identical but have opposite polarity.~~

32. (currently amended) A bi-phase modulator for an ultra wideband signal, comprising:

a symmetrical transformation device that receives an input UWB waveform and converts the energy of the input waveform into the energy of a first output waveform ~~and~~or a second output waveform, wherein the first output waveform and second output waveform are substantially identical waveforms of opposite polarity; and

a selector device that determines based on an information signal which one of the first output waveform ~~and~~or ~~the~~ second output waveform ~~are~~is presented at the output of the bi-phase modulator.

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33. (new) The bi-phase modulator of claim 17, said symmetrical transformation device comprising:

- an unbalanced input; and
- two unbalanced outputs.